Answer on Question #38476, Physics, Mechanics | Kinematics | Dynamics

Question:

You are to drive to an interview in another town, at a distance of 310 km on an expressway. The interview is at 11:15 a.m. You plan to drive at 100 km/h, so you leave at 8:00 a.m. to allow some extra time. You drive at that speed for the first 120 km, but then construction work forces you to slow to 40.0 km/h for 43.0 km. What would be the least speed (in km/h) needed for the rest of the trip to arrive in time for the interview?

Answer:

Time needed for drive a distance 120 km at 100 km/h:

$$t_1 = \frac{120}{100} = 1.2\ h$$

Time needed for drive a distance 43 km at 40 km/h:

$$t_2 = \frac{43}{40} = 1.075\ h$$

$$t_3 = 3h\ 15m - 1.2\ h - 1.075\ h = 0.975\ h$$

Distance to town equals:

$$s_3 = 310 - 120 - 43 = 147\ km$$

Least speed needed to arrive in time for the interview:

$$v_3 = \frac{147\ km}{0.975\ h} = 151\frac{km}{h}$$

Answer: $151\frac{km}{h}$